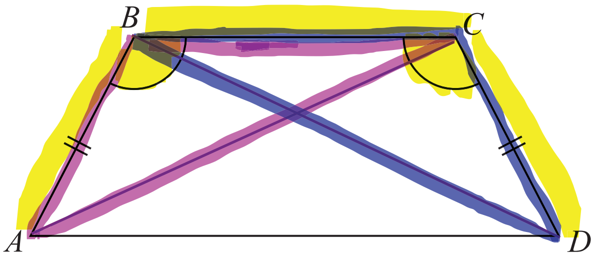
1. *ABCD* is a quadrilateral.

Both triangles share BC



AB = *CD*.
Angle *ABC* = angle *BCD*.

Prove that *AC* = *BD*.

Two triangles that are congruent are identical in size and shape.

SSS, SAS, ASA, AAS and RHS

Angle ABC = angle BCD. (1)

Line AB = line CD. (1)

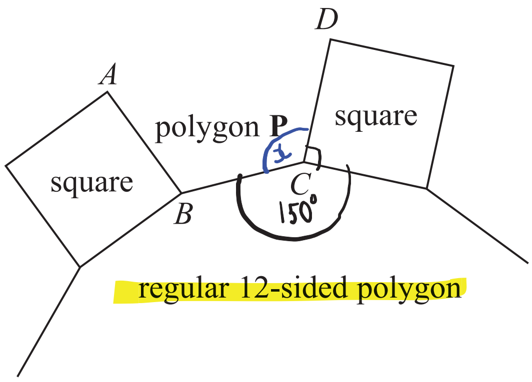
Line BC = line BC (common side between both triangles) (1)

Triangle ABC = triangle BCD because they share two equal side lengths and the angle in between them (SAS)

Therefore, line AC = line BD. (1)

(Total for Question is 4 marks)

2. In the diagram, AB, BC and CD are three sides of a regular polygon **P**.



Show that polygon **P** is a hexagon. → 6 sides.
You must show your working.

Exterior angle $= \frac{360}{\text{no. of sides}}$. Interior + exterior = 180°.

12-sided shape: Exterior $= \frac{360}{12} = 30°$ (1)

$\therefore$ Interior $= 180° - 30° = \underline{150°}$

Hexagon: exterior $= \frac{360}{6} = 60°$ (1)

$\therefore$ interior $= 180° - 60° = \underline{120°}$

(1)

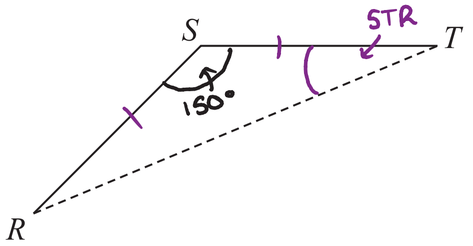
Interior angle of polygon P: $360 - (150 + 90) = \underline{120°}$

$\boxed{\text{Polygon P is a hexagon because it has an interior angle size of } 120°.}$ (1)

(Total for Question is 4 marks)

3.

RS = ST
STR = SRT



RS and ST are 2 sides of a regular 12-sided polygon.
RT is a diagonal of the polygon.

Work out the size of angle STR.
You must show your working.

Interior angle of polygon $= \dfrac{(\text{N° of sides} - 2) \times 180}{\text{N° of sides}}$

$= \dfrac{(12-2)\times 180}{12}$

$= 150°$ ✓

$180 - 150 = STR + SRT$

$30 = STR + SRT$

$\frac{30}{2} = SRT$ ✓

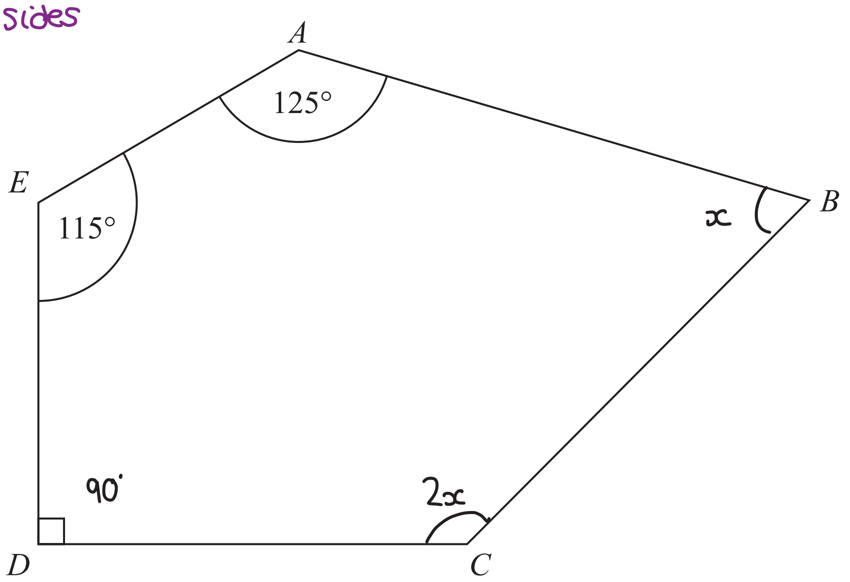
$15° = SRT$

15 ✓ °

(Total for Question is 3 marks)

4. *ABCDE* is a pentagon.

5 sides



Angle *BCD* = 2 × angle *ABC*

Work out the size of angle *BCD*.
You must show all your working.

Let $\angle ABC = x$ $\therefore \angle BCD = 2x$

Sum of interior angles of a pentagon:

number of sides

$(n-2)\times 180 = (5-2)\times 180$ 1

$= 180\times 3$

$= 540°$ 1

Setting up an equation in x:

$x + 2x + 90 + 115 + 125 = 540$ 1

$3x = 210$ 1

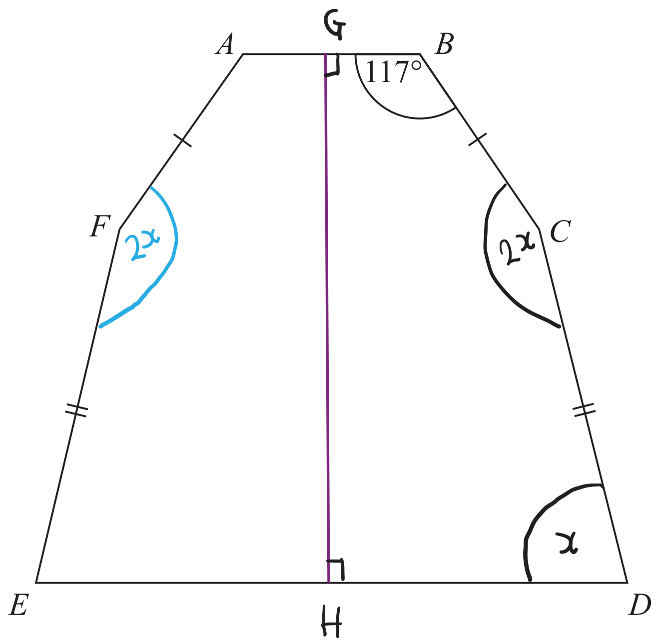
$x = 70°$

$\angle BCD = 2x = 2\times 70 = 140°$

140 1 °

(Total for Question is 5 marks)

5. The diagram shows a hexagon.
The hexagon has one line of symmetry.



FA = *BC*
EF = *CD*
Angle *ABC* = 117°

Shape BCDHG is a pentagon.

Angle *BCD* = 2 × angle *CDE*

Work out the size of angle *AFE*.
You must show all your working.

Sum of interior angles in a pentagon

$= (5-2) \times 180 = 540°$ (1)

$117° + 90° + 90° + 2x + x = 540°$

$297° + 3x = 540°$

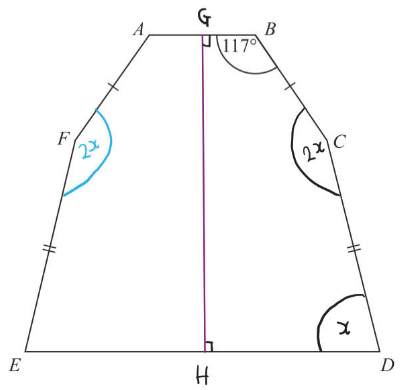
$\div 3 \quad 3x = 243° \quad \div 3$

$\therefore x = 81°$ (1)

$\angle BCD = \angle AFE = 2x$ (1)

$\therefore \angle AFE = 2x = 2 \times 81°$

$= \underline{\underline{162°}}$

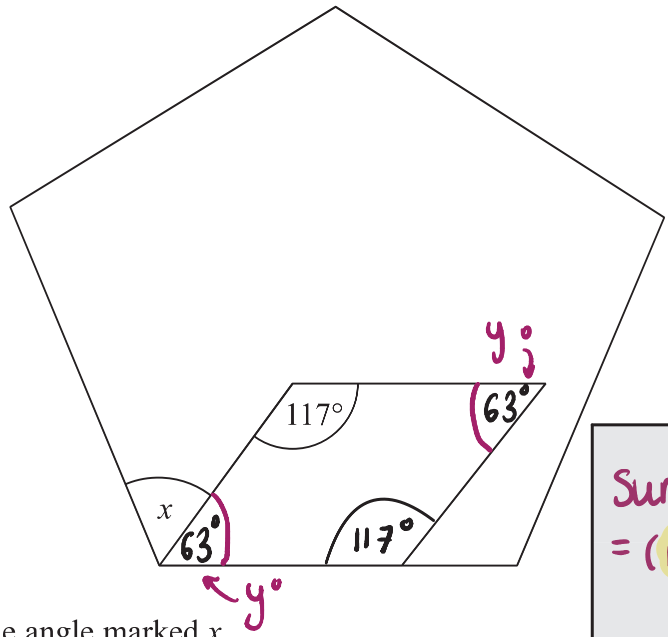


(1)

162 °

(Total for Question is 4 marks)

6. The diagram shows a regular pentagon and a parallelogram.



Work out the size of the angle marked x.
You must show all your working.

Sum of interior angles
$= (n-2) \times 180$
number of sides
$\therefore (5-2) \times 180$
$= 3 \times 180 = 540°$

① Angles opposite in parallelogram are equal

② Sum of interior angles in parallelogram is 360°

$117 + 117 + y + y = 360$
$234 + 2y = 360$
$-234 \quad -234$
$\frac{2y}{2} = \frac{126}{2}$
$y = 63$ (1)

③ Sum of interior angles in a pentagon is 540°

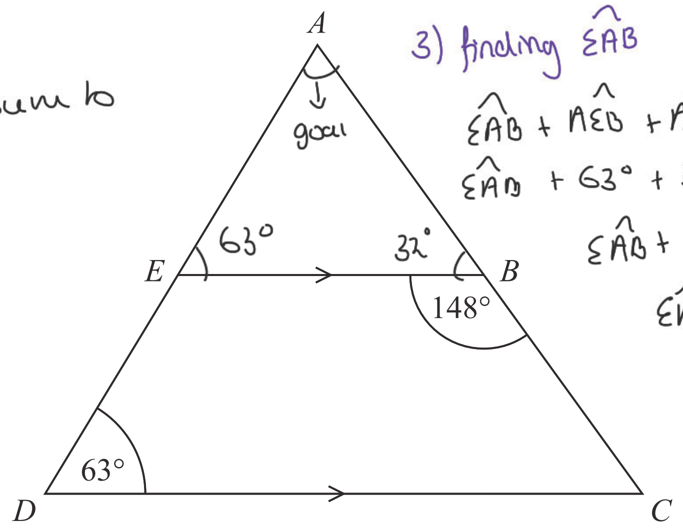
$\therefore$ one angle $= \frac{540}{5} = 108°$ (1)

$x + 63 = 108$
$-63 \quad -63$ (1)
$x = 45$

45 ° (1)

7. *ADC* is a triangle.

Angles in a triangle sum to 180°. ✓5



3) finding $\hat{EAB}$

$\hat{EAB} + \hat{AEB} + \hat{ABE} = 180°$

$\hat{EAB} + 63° + 32° = 180°$ ✓2

$\hat{EAB} + 95° = 180°$

$\hat{EAB} = 180° - 95°$

$= 85°$

AED and *ABC* are straight lines.
EB is parallel to *DC*.

Angle *EBC* = 148°
Angle *ADC* = 63°

Work out the size of angle *EAB*.
You must give a reason for each stage of your working.

1) finding angle $\hat{AEB}$.

$\hat{AEB}$ and $\hat{ADC}$ are corresponding angles (AE is on the line AED and EB and DC are parallel).

↳ $\hat{AEB} = \hat{ADC} \rightarrow \hat{AEB} = 63°$ ✓1

2) finding angle $\hat{ABE}$.

Line ABC is a straight line, and angles on a line sum to 180° ✓4

$\hat{ABE} + \hat{EBC} = 180°$

$\hat{ABE} + 148° = 180°$) − 148°

148°

$\hat{ABE} = 180° - 148°$

$\hat{ABE} = 32°$ ✓2

$\therefore \hat{EAB} = 85°$ ✓3

(Total for Question is 5 marks)